GRIFFIN INTERNATIONAL INC

DEC 28 10 37 AM '98

98-2411

December 23, 1998

Mr. Wally Kangas
3078 Route 10
Chester, Vermont 05143

Re: Site Investigation Report, Rental Property
Box 745, Route 11, Springfield, Vermont

Dear Mr. Kangas:

Enclosed please find the report titled *Report on the Investigation of Subsurface Contamination at Wally Kangas Rental Property, Box 745, Route 11, Springfield, Vermont.* This report summarizes information gathered during UST removal, subsurface drilling, and groundwater monitoring at the property in the interval from June 17, 1998 to October 29, 1998. Conclusions drawn from the gathered data as well as recommendations regarding future activity at the site are also presented in this report.

In summary, dissolved petroleum compounds were present at levels above the Vermont Groundwater Enforcement Standards (VGES) in wells MW-2 and MW-4. Groundwater flow across this area of the property is depicted as flowing to the north, which is consistent with the discovery of contamination in the aforementioned wells. The two small ponds, the basement of the residence, and the water supply well at the property appear to be at minimal risk from the contamination present in soil and groundwater in the vicinity of the removed UST.

Griffin International recommends that no additional activity be performed at the site, aside from the following: 1. Sampling and analysis of MW-1 through MW-4 for the presence of BTEX and MTBE (compounds typically present in gasoline) by EPA Method 8021B. 2. Sampling and analysis of the supply well at the site for the same compounds as a means of confirming that this supply well has not been impacted by the release of petroleum in the vicinity of the former UST. 3. Inspection of the pond downgradient of the former UST for signs of petroleum (free product, odors, sheen) during visits to the property. These recommendations are subject to the approval of the Vermont Department of Environmental Conservation. It is not known at this time whether additional work will be required at this site beyond the recommendations made by Griffin.

If you have any questions or comments regarding this site, please feel free to call me at (802) 865-4288.

Sincerely,

Willis Doe

Willis Doe
Environmental Engineer
Att

cc: Mr. Chuck Schwer, VTDEC
File 69841279

P.O. Box 943 • Williston, VT 05495 • Phone/Fax 802-865-4288
59 Clinton Street • Plattsburgh, NY 12901 • 518-562-4666 • Fax 518-561-6832

# REPORT ON THE INVESTIGATION OF SUBSURFACE PETROLEUM CONTAMINATION
at
# WALLY KANGAS RENTAL PROPERTY
# BOX 745, ROUTE 11
# SPRINGFIELD, VERMONT

**December, 1998**

Prepared for:

Mr. Wally Kangas

3078 Route 10
Chester, VT 05143

Prepared by:

GRIFFIN INTERNATIONAL

P.O. Box 943
Williston, Vermont 05495
(802) 865-4288

Griffin Project #: 69841279

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## APPENDICES

## I. INTRODUCTION

This report summarizes the investigation of subsurface petroleum contamination at the rental property owned by Mr. Wally Kangas of Chester, Vermont. The property is located at Box 745 on Route 11 in Springfield, Vermont (see Site Location Map, Appendix A). The following investigation has been conducted to define more clearly the degree and extent of petroleum contamination detected in the soils and groundwater at this site during the removal of a 550 gallon gasoline underground storage tank (UST) on June 17, 1998. Included in the report are the findings from the soil borings and the results of subsequent groundwater sampling conducted at the property, an evaluation of potential sensitive receptors in the area, conclusions drawn from data collected at the site, and recommendations regarding future work at the site.

This work has been completed for Mr. Wally Kangas by Griffin International, Inc. (Griffin) under the Vermont Department of Environmental Conservation (VTDEC) Expressway process and in accordance with the Cost Estimate for Initial Site investigation dated June 22, 1998.

## II. HISTORICAL BACKGROUND

On June 17, 1998, a 550-gallon gasoline UST was removed from the subsurface at the rental property owned by Mr. Wally Kangas.[1] The UST was located on the north side of the residence. During the removal, petroleum contamination was discovered in soil and groundwater in the vicinity of the UST. The tank had been out of service for approximately 12 years prior to removal. No water was present in the UST at the time it was pumped of residual product, and, according to the site owner, product level in the UST remained essentially unchanged in the interval the UST was out of service. No dispenser or piping were associated with the UST at the time of removal. The former location of the tank is shown on the Site Map in Appendix A.

Upon removal, three holes ranging in size from 1/8" to 1/4" were observed in the southern sidewall of the UST. Volatile organic compounds (VOCs) were detected in the soils surrounding the tank using a portable photoionization device (PID). A peak PID reading of 280 parts per million (ppm) was measured at a depth of 6' below grade, and the average PID reading for the collected samples was 68 ppm. Groundwater was encountered at approximately 7.0' below grade during the removal of the tank. A moderate sheen was observed on the water table during the UST removal. Soils at the depth of the water table were found to be contaminated, indicating that the groundwater in the area had likely been impacted by the release of petroleum[1].

In response to the soil and groundwater contamination detected during the removal of the UST, Griffin submitted a Site Investigation Expressway Notification Form to the VTDEC on behalf of Mr. Kangas on June 22, 1998. Approval to proceed with the Expressway investigation was granted by Mr. Bob Butler of the VTDEC on July 21, 1998 via facsimile

transmission of the signed Expressway Notification Form. The following report presents the findings from Griffin's Site Investigation conducted in October, 1998.

## III. SITE DESCRIPTION

The site is located at mailbox 745 on the north side of Route 11 in the town of Springfield, Vermont. Two small (<1000 $ft^2$ each) ponds are located approximately 100' to the north-northwest of the former location of the 550 gallon gasoline UST. Local terrain slopes downward and northwest toward the ponds. The elevation of the site is approximately 900 feet above mean sea level.

This property is located in a rural setting surrounded primarily by wooded terrain. Several private residences are located in the area, the closest being approximately 200 yards to the north. One private shallow water supply well is located on the property approximately 60 feet west of the former location of the UST. There are no municipal water or sewer services in the immediate area.

The Surficial Geologic Map of Vermont depicts the surrounding area as glacial till.[2] Actual subsurface materials consist of fine to medium sands with some gravel. The Centennial Geologic Map of Vermont depicts bedrock at the site as Pre-Cambrian Gneiss.[3] Bedrock was not encountered during excavation or drilling activities at the site.

## IV. SUBSURFACE INVESTIGATION

On October 13, 1998, five soil borings were advanced into the subsurface at the site by T&K Drilling, Inc., of Troy, New Hampshire, using a truck-mounted, 4.25" inside diameter (ID) hollow-stem auger drill rig. Monitoring wells were installed in four of the borings. The monitoring wells, designated MW-1 through MW-4, were installed to help define the degree and extent of petroleum contamination in the vicinity of the former gasoline UST.

The boring for MW-1 was advanced southwest of the former UST excavation, upgradient (assumed) of the source area. The borings for MW-2, MW-3, and MW-4 were advanced northwest, west, and north of the former tank pit, respectively, in areas potentially downgradient of the source area. These four borings were completed as monitoring wells. Boring SB-5 was advanced north of both the source area and MW-4 in an effort to better delineate the extents of contamination. No well was installed in this boring. The locations of the wells and boring SB-5 are shown on the Site Map in Appendix A.

Soil samples were collected at five foot intervals in each boring using a two-foot long, 2" ID stainless steel split-spoon sampler. The sampler was decontaminated in the field with a solution of Alconox (a detergent) and water to prevent potential cross-contamination. Soil samples were screened for VOCs using an H-Nu Model PI-101 PID. In addition, soil characteristics were recorded in boring logs by the Griffin drilling supervisor.

All of the monitoring wells are constructed of newly threaded, flush-joint, schedule 40, 2" ID polyvinyl chloride (PVC) riser attached to a 0.010-slot, 2" ID PVC screen. The screen is attached to the riser by a watertight, threaded, flush joint coupling. A sealed, watertight roadway box was installed at grade to protect the well, and the top of the riser is capped with a lockable expansion plug. The screened interval in wells MW-1, MW-2, and MW-4 is from 3' to 13' below grade. MW-3 is screened from 3' to 11.25' below grade. A silica sand pack was placed around the screened portion of each well and a bentonite seal was placed in the annulus immediately above the sand pack. Please refer to the Well Logs in Appendix B for details on the construction of each well.

Samples collected in the each boring generally consisted of brown, fine to coarse sand, with variable amounts of fine and coarse gravel throughout. Bedrock refusal was not encountered in any of the borings. Groundwater was present between 4.5 and 5.1 feet below grade in the borings. No visual or olfactory evidence of contamination was noted in soils collected from borings MW-1, MW-2, MW-3, and SB-5. Petroleum odors were detected in the three split-spoon samples collected in boring MW-4, and a maximum PID reading of 250 ppm was detected at 5' to 6' below grade.

## V. WATER LEVELS AND WATER QUALITY

### A. Water Table Elevations

Water table elevation measurements were collected from MW-1 through MW-4 on October 29, 1998. In addition, the monitoring wells were surveyed in azimuth and elevation relative to the top of the inner lip of the roadway box for MW-1, which has been assigned an arbitrary elevation of 100.00 feet. Liquid level monitoring data are presented in Appendix C.

Water table elevations have been plotted and contoured to illustrate the estimated gradient and direction of groundwater flow beneath the site (see Groundwater Contour Map, Appendix A). According to these data, groundwater is flowing to the north at a hydraulic gradient of 1.67%.

The northerly flow of groundwater at the site corresponds with the topography of the site. MW-1 is upgradient of the release area, MW-2 is crossgradient from the release area, MW-3 is downgradient and slightly crossgradient of the release area, and MW-4 and boring SB-5 are directly downgradient of the release area. The placement of the monitoring points and soil boring has adequately defined the extent of the petroleum present in the subsurface at the site.

### B. Water Quality

Griffin collected groundwater samples at the site from each of the monitoring wells on October 29, 1998. The groundwater samples were analyzed for VOCs by EPA Method 8021B. The analytical results have been plotted to show the distribution of dissolved

petroleum compounds in groundwater at the site (see Contaminant Concentration Map, Appendix A).

Benzene, toluene, ethylbenzene, and xylenes (BTEX) and methyl tert-butyl ether (MTBE) were not detected in quantities above laboratory detection limits or Vermont Groundwater Enforcement Standards (VGES) in the samples from MW-1 and MW-3. The VGES for benzene, naphthalene, 1,3,5-trimethyl benzene, and 1,2,4-trimethyl benzene were exceeded in the samples collected from MW-2 and MW-4. MTBE was not detected above laboratory detection limits in these samples. However, the detection limit in each case is above the VGES for MTBE. MTBE may be present above the VGES in these wells. A groundwater quality summary for this sampling event is presented in Appendix D. The Endyne laboratory report detailing the results of groundwater monitoring is also included in Appendix E.

The trip blank and duplicate sample analytical results indicate that proper quality assurance and quality control were maintained during the sampling and analysis. All samples were collected in accordance with Griffin protocols which comply with applicable state and industry standards.

## VI. RECEPTOR RISK ASSESSMENT

A receptor risk assessment was conducted to identify known and potential receptors of the petroleum detected at the Kangas property. A visual survey was conducted at the time of monitoring well installation and during the UST closure inspection. A determination of the potential risk to identified receptors was conducted based on proximity to the source area, strength of the source area, groundwater flow direction and gradient, and contaminant concentration levels.

*Water Supplies*

As outlined in Section III of this report, the area in the vicinity of the Kangas property is not serviced by a municipal water system. The shallow drinking well at the site is approximately 60 feet from the former UST pit in a crossgradient direction with respect to shallow groundwater flow. This well does not appear to be at risk from the petroleum contamination associated with the 550 gallon UST removed on June 17, 1998, based on groundwater flow direction measured on October 28, 1998, and based on the absence of dissolved petroleum contamination in MW-3.

There are no structures located hydraulically downgradient of the source area with water supplies potentially affected by this release.

*Surface Water*

The closest surface water to the source area are the two small unnamed pond and associated stream approximately 100' to the north and northwest of the former UST area.

Water in the pond and stream were visually inspected during UST closure activities and again during the installation of monitoring wells. No sheen or signs of product were detected during either inspection. Because of the apparent low levels of dissolved VOCs present in the source area at the site and given that the contaminant source (550 gallon gasoline UST) has been removed, potential risk to the ponds and stream is considered limited at this time.

*Buildings in the Vicinity*

The residence at the site has a basement for the potential accumulation of petroleum vapors. This basement is located approximately 24 feet southeast of the former tank area. This basement was screened in June of 1998 during the UST closure and again in October during the installation of monitoring wells. No VOCs were detected using the PID on these occasions, indicating the basement has not been impacted. There are no other buildings in the area with the potential for vapor impact from the source area at the site.

## VII. CONCLUSIONS

Based on the investigation at this site, Griffin has reached the following conclusions:

1. There has been a release of gasoline from the former UST at the site. The duration and quantity of the release is unknown. Evidence obtained during UST closure activities and soil boring activities suggests the release was limited in degree and extent.

2. From the five soil borings, varying compositions of sand and gravel are observed to overlay bedrock at the site. VOCs were detected by PID in one of the five soil borings (MW-4) advanced for this site investigation. This boring is located directly downgradient of the former UST excavation.

3. The water table elevation beneath the site, as measured using the interface probe, ranged from approximately 4.5' to 5.0' below grade on October 29, 1998. Based on the water table elevation data collected at that time, groundwater beneath the site is flowing north at a hydraulic gradient of approximately 1.7%.

4. Dissolved VOCs were detected in the groundwater samples collected from wells MW-2 and MW-4, located downgradient from the former tank pit. The Vermont Groundwater Enforcement Standards for benzene, naphthalene, 1,3,5 trimethyl benzene, and 1,2,4 trimethyl benzene were exceeded in these samples. Upgradient well MW-1 and crossgradient well MW-3 were free of dissolved VOCs above detection limits.

5. The risk assessment for this site has determined that there is likely limited risk to the on-site drinking water supply or the basement of the residence at the property.

6. As the source of the petroleum release has been removed, and because no free phase product was encountered, it is expected that the residual petroleum in soil and groundwater at the site will eventually be reduced by the natural processes of dilution, dispersion, volatilization, and biodegradation.

## IX. RECOMMENDATIONS

Based on the above conclusions, Griffin recommends the following:

1. The four on-site monitoring wells should be sampled for the presence of EPA 8021B compounds in April of 1999. Monitoring should be continued at six-month intervals until such time when contaminant levels drop below Vermont Groundwater Enforcement Standards.

2. The pond downgradient of the former UST area should be visually inspected for signs of petroleum contamination, if possible, each time groundwater samples are collected. If signs of product are observed, on sample should be collected from pond waters and analyzed by EPA Method 8021B.

3. As a means of confirming that the on-site supply well has not been impacted by the release of petrolum at the site, one sample should be collected from the on-site water supply well immmediately following the approval of these recommendations. Sample collection and analysis should be expedited as Mr. Kangas expects to be renting the house at the beginning of 1999. The collected supply well samples should be analyzed for the presence of BTEX and MTBE by EPA Method 8021B.

## REFERENCES


1. Griffin International, Inc., June 23, 1998, *UST Closure Report, Wally Kangas Property.*

2. Doll, Charles G., ed., 1970, *Surficial Geologic Map of Vermont*, State of Vermont.

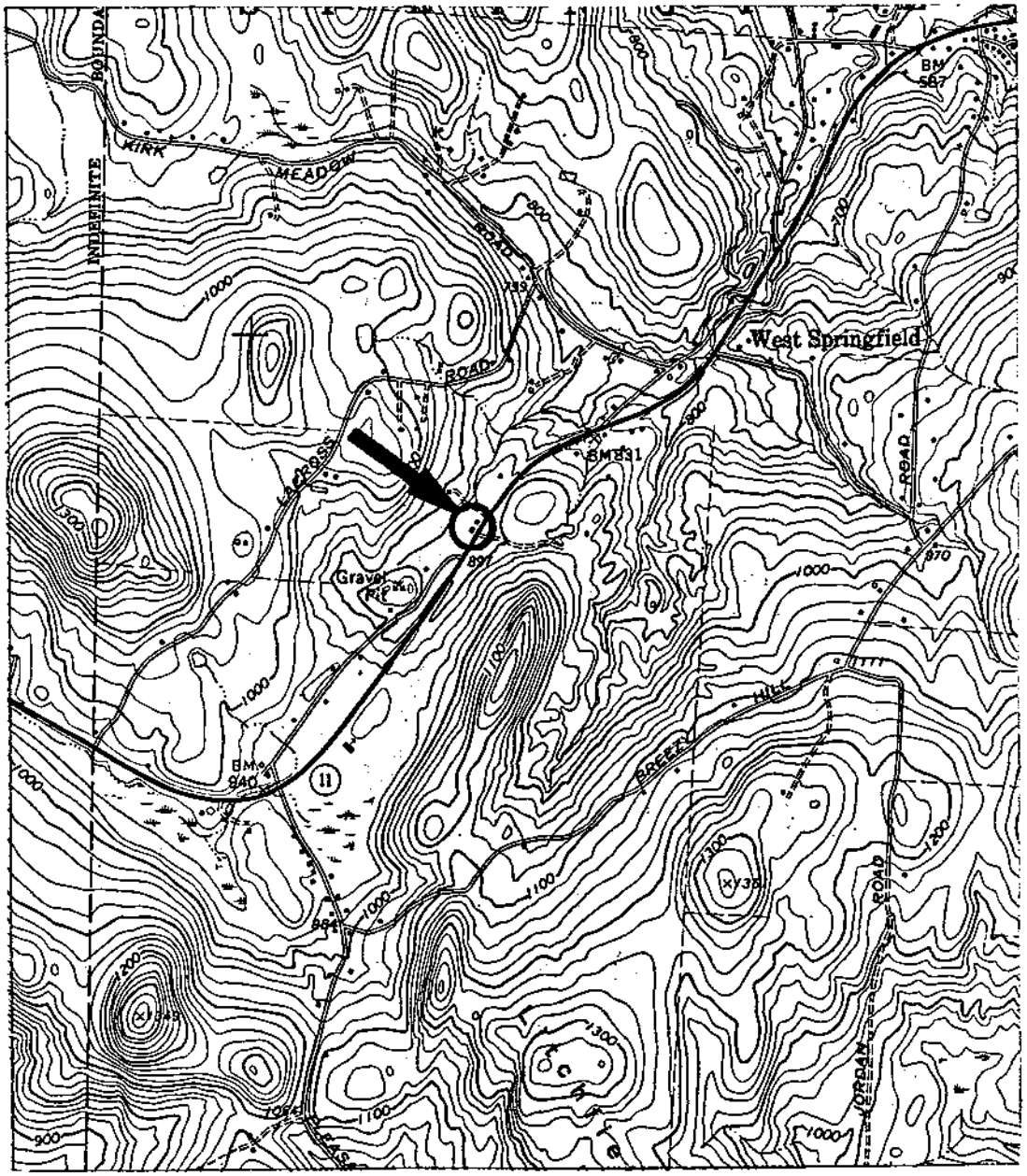
3. Doll, Charles G., ed., 1970, *Centennial Geologic Map of Vermont*, State of Vermont.

# APPENDICES

# APPENDIX A

## Maps

Site Location Map
Site Map
Groundwater Contour Map
Contaminant Concentration Map




JOB #: 69841279
SOURCE: USGS- CHESTER, VERMONT QUADRANGLE

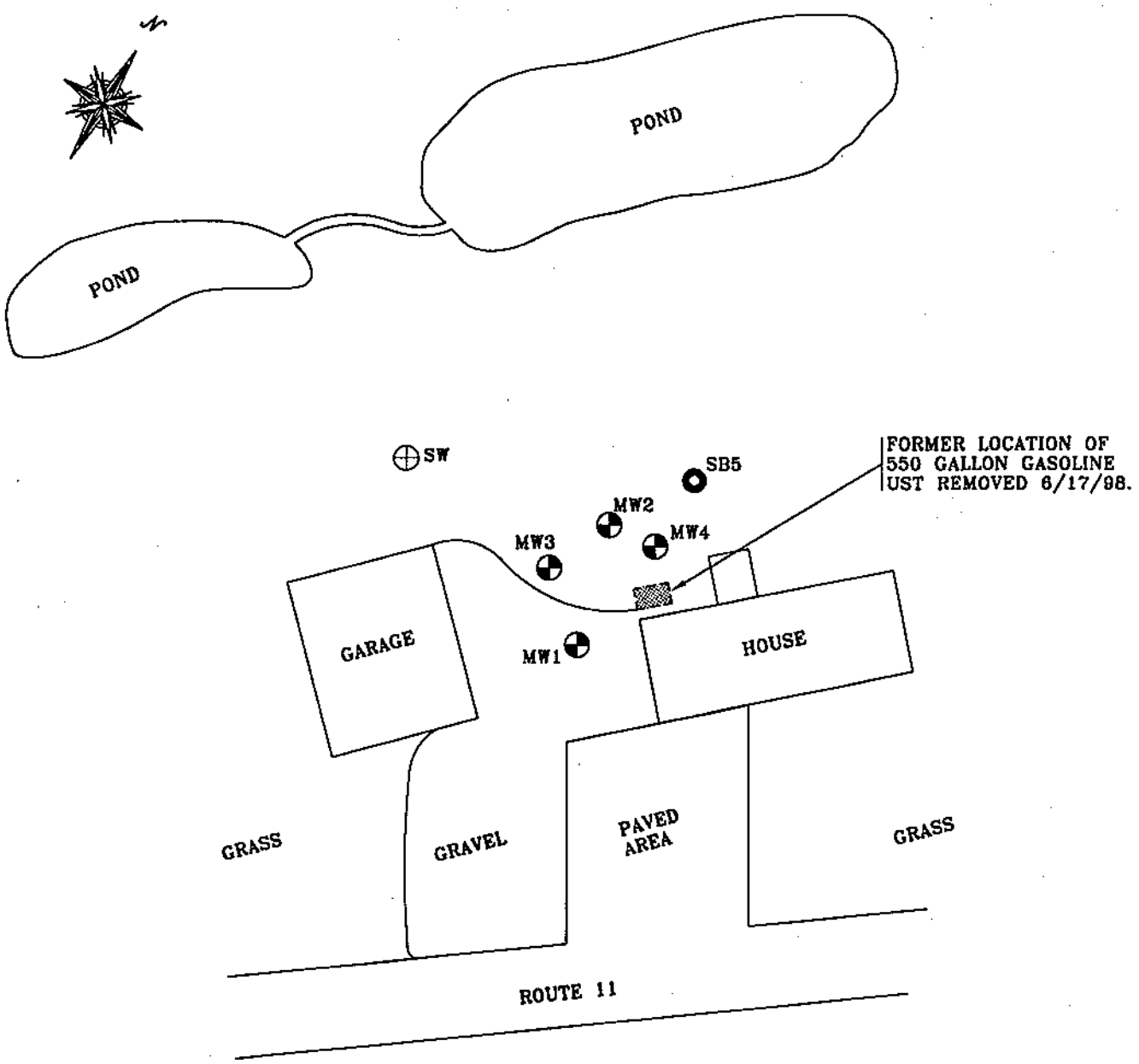
GRIFFIN INTERNATIONAL INC

# KANGAS PROPERTY

## SPRINGFIELD, VERMONT

## SITE LOCATION MAP

| DATE: 10/21/98 | DWG.#:1 | SCALE: 1:24000 | DRN.:SB | APP.:WD |
|---|---|---|---|---|




## LEGEND

- MW2 — MONITORING WELL
- SW — SUPPLY WELL
- SB5 — SOIL BORING

JOB #: 69841279

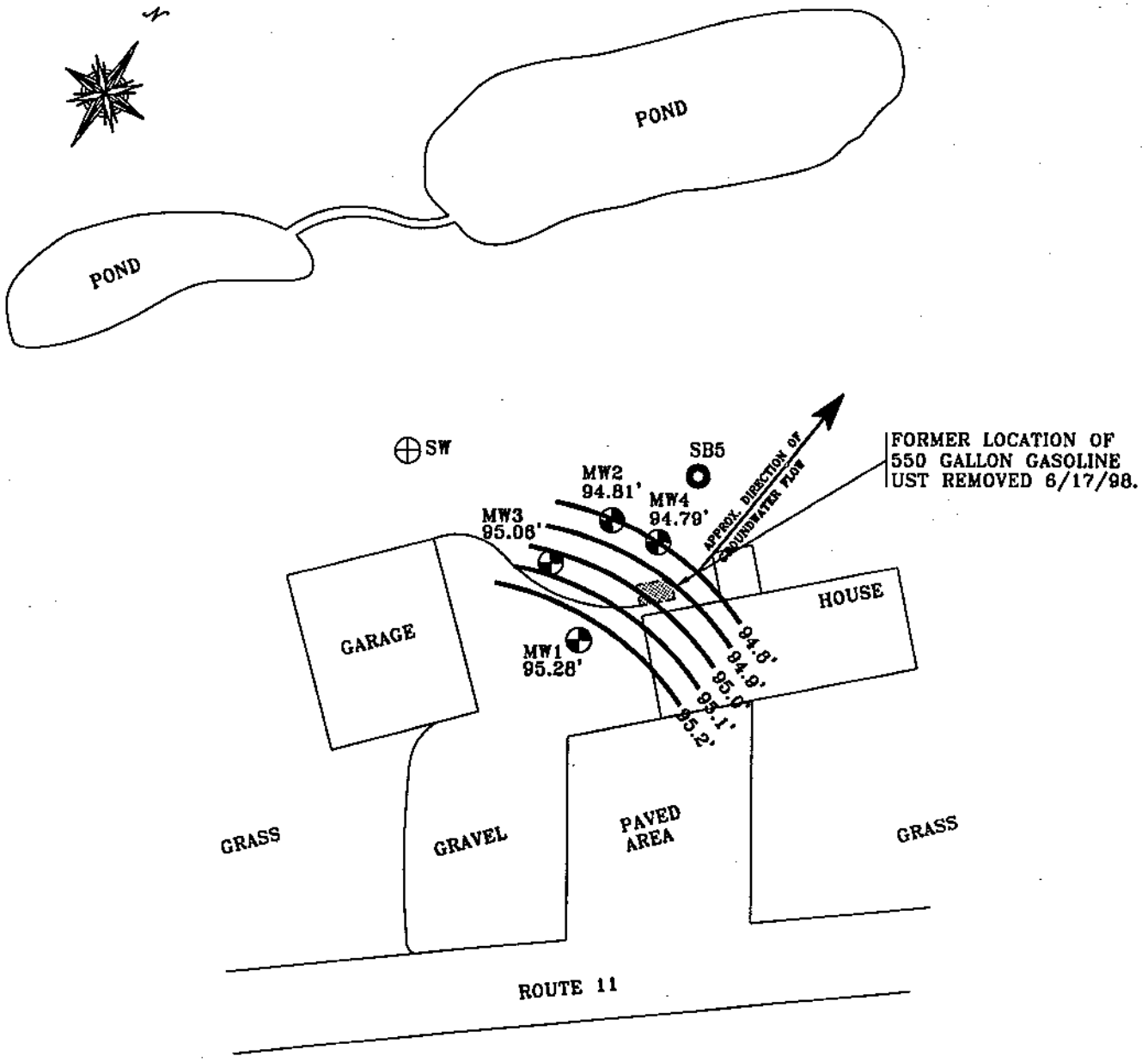
GRIFFIN INTERNATIONAL INC

# KANGAS PROPERTY

SPRINGFIELD, VERMONT

## SITE MAP

| DATE: 12/8/98 | DWG.#:2 | SCALE: 1"=40' | DRN.:SB | APP.:WD |
|---|---|---|---|---|




## LEGEND

- MW2 94.81' — MONITORING WELL AND WATER TABLE ELEVATION IN FEET
- 95.1' — GROUNDWATER CONTOUR IN FEET (DASHED WHERE INFERRED)
- SW — SUPPLY WELL
- SB5 — SOIL BORING

JOB #: 69841279

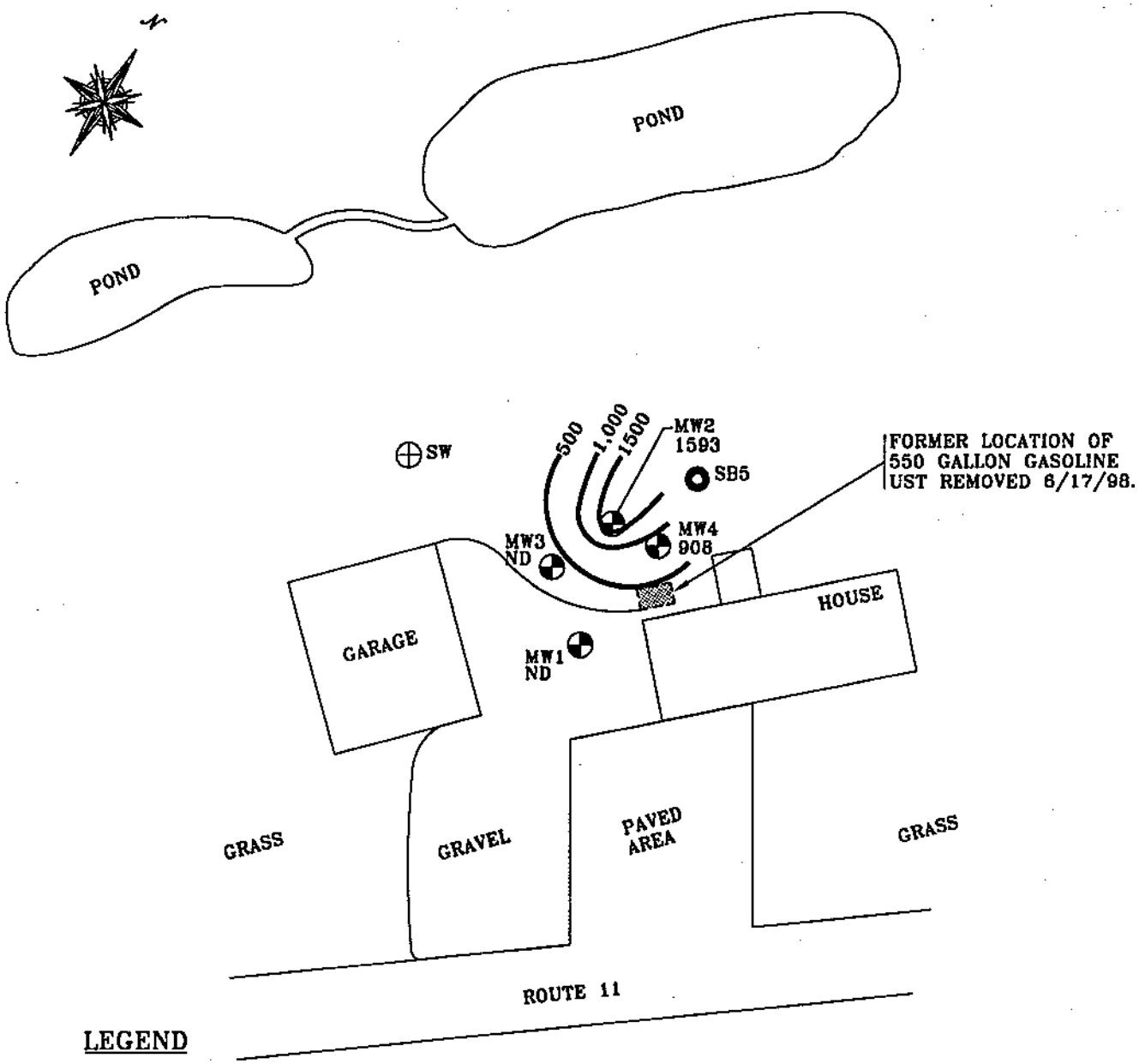
GRIFFIN INTERNATIONAL INC

# KANGAS PROPERTY

SPRINGFIELD, VERMONT

## GROUNDWATER CONTOUR MAP
MEASUREMENT DATE: 10/29/98

| DATE: 12/8/98 | DWG.#:3 | SCALE: 1"=40' | DRN.:SB | APP.:WD |
|---|---|---|---|---|




## LEGEND

MW2 1593 — MONITORING WELL AND TOTAL BTEX CONCENTRATION (ppb)

500 — ISOCONCENTRATION CONTOUR, TOTAL BTEX (ppb), (DASHED WHERE INFERRED)

ND — NONE DETECTED

SW — SUPPLY WELL

SB5 — SOIL BORING

JOB #: 69841279

GRIFFIN INTERNATIONAL INC

# KANGAS PROPERTY

SPRINGFIELD, VERMONT

CONTAMINANT DISTRIBUTION MAP
SAMPLE DATE: 10/29/98

| DATE: 12/8/98 | DWG.#:4 | SCALE: 1"=40' | DRN.:SB | APP.:WD |
|---|---|---|---|---|

# APPENDIX B

## Well Logs

WELL NUMBER MW1

PROJECT KANGAS PROPERTY

LOCATION SPRINGFIELD, VERMONT

DATE DRILLED 10/13/98 TOTAL DEPTH OF HOLE 15.0'

DIAMETER 4.25"

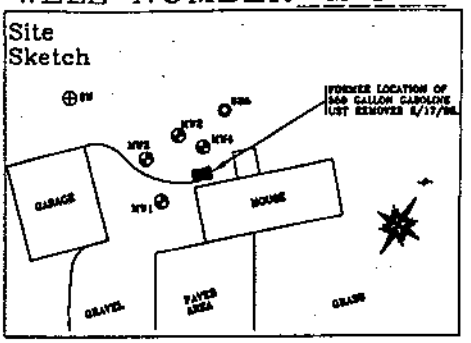
SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 2.5' TYPE sch 40 pvc

DRILLING CO. T&K DRILLING METHOD HSA

DRILLER ALAN & KEVIN LOG BY W. DOE

Site Sketch




*GRIFFIN INTERNATIONAL, INC*

| DEPTH IN FEET | WELL CONSTRUCTION | NOTES | BLOWS PER 6" OF SPOON & PID READINGS | DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES) | DEPTH IN FEET |
|---|---|---|---|---|---|
| 0 | | ROAD BOX<br>LOCKING WELL CAP<br>CONCRETE | | | 0 |
| 1 | | NATIVE BACKFILL | | | 1 |
| 2 | | BENTONITE | | | 2 |
| 3 | | WELL RISER | | | 3 |
| 4 | | | | | 4 |
| 5 | | | | 5.0' WATER TABLE | 5 |
| 6 | | | 5'-7' 20/27/35/51<br>0 ppm | Moist, brown, fine to coarse SAND, some fine gravel, trace coarse gravel, no odor. | 6 |
| 7 | | SAND PACK | | | 7 |
| 8 | | | | | 8 |
| 9 | | | | | 9 |
| 10 | | WELL SCREEN | | | 10 |
| 11 | | | 10'-12' 9/12/9/22<br>0 ppm | Wet, brown, fine to coarse SAND, trace coarse gravel, grading to wet, brown, fine to medium SAND, trace fine and coarse gravel, no odor. | 11 |
| 12 | | BOTTOM CAP | | | 12 |
| 13 | | | | | 13 |
| 14 | | | 13'-15' 5/9/17/20<br>0 ppm | Wet, brown, fine to coarse SAND, some coarse gravel, no odor. | 14 |
| 15 | | | | | 15 |
| 16 | | UNDISTURBED NATIVE SOIL | | BASE OF WELL AT 13'<br>END OF EXPLORATION AT 15' | 16 |
| 17 | | | | | 17 |
| 18 | | | | | 18 |
| 19 | | | | | 19 |
| 20 | | | | | 20 |
| 21 | | | | | 21 |
| 22 | | | | | 22 |
| 23 | | | | | 23 |
| 24 | | | | | 24 |
| 25 | | | | | 25 |

PROJECT KANGAS PROPERTY

LOCATION SPRINGFIELD, VERMONT

DATE DRILLED 10/13/98 TOTAL DEPTH OF HOLE 15.0'

DIAMETER 4.25"

SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

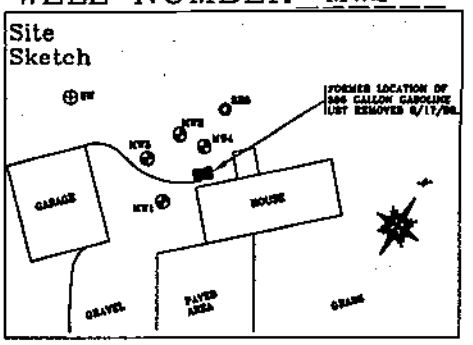
CASING DIA. 2" LENGTH 2.5' TYPE sch 40 pvc

DRILLING CO. T&K DRILLING METHOD HSA

DRILLER ALAN & KEVIN LOG BY W. DOE

WELL NUMBER MW2

Site Sketch




*GRIFFIN INTERNATIONAL, INC*

| DEPTH IN FEET | WELL CONSTRUCTION | NOTES | BLOWS PER 6" OF SPOON & PID READINGS | DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES) | DEPTH IN FEET |
|---|---|---|---|---|---|
| 0 | | ROAD BOX<br>LOCKING WELL CAP<br>CONCRETE | | | 0 |
| 1 | | NATIVE BACKFILL | | | 1 |
| 2 | | BENTONITE | | | 2 |
| 3 | | WELL RISER | 3'-5' 14/27/40/46<br>0 ppm | Dry, brown, fine to coarse SAND, some fine and coarse gravel, no odor.<br>4.5' WATER TABLE ▼ | 3 |
| 4 | | | | | 4 |
| 5 | | | | | 5 |
| 6 | | | 5'-7' 17/29/20/26<br>0 ppm | Moist, red/brown, medium to coarse SAND, some fine and coarse gravel, trace cobbles, bottom 2" of sample wet, no odor. | 6 |
| 7 | | SAND PACK | | | 7 |
| 8 | | | | | 8 |
| 9 | | | | | 9 |
| 10 | | WELL SCREEN | | | 10 |
| 11 | | | 10'-12' 11/17/30/46<br>0 ppm | Wet, brown, fine to coarse SAND, some fine and coarse gravel, trace cobbles, bottom 2" of spoon wet, brown, fine to medium SAND, no odor. | 11 |
| 12 | | BOTTOM CAP | | | 12 |
| 13 | | | | | 13 |
| 14 | | | 13'-15' 10/36/48/66<br>0 ppm | Wet, brown, coarse SAND, grading to fine to medium sand in last 10" of sample. Trace coarse gravel and cobbles throughout, no odor. | 14 |
| 15 | | UNDISTURBED NATIVE SOIL | | BASE OF WELL AT 13'<br>END OF EXPLORATION AT 15' | 15 |
| 16 | | | | | 16 |
| 17 | | | | | 17 |
| 18 | | | | | 18 |
| 19 | | | | | 19 |
| 20 | | | | | 20 |
| 21 | | | | | 21 |
| 22 | | | | | 22 |
| 23 | | | | | 23 |
| 24 | | | | | 24 |
| 25 | | | | | 25 |

WELL NUMBER MW3

PROJECT KANGAS PROPERTY

LOCATION SPRINGFIELD, VERMONT

DATE DRILLED 10/13/98 TOTAL DEPTH OF HOLE 11.5'

DIAMETER 4.25"

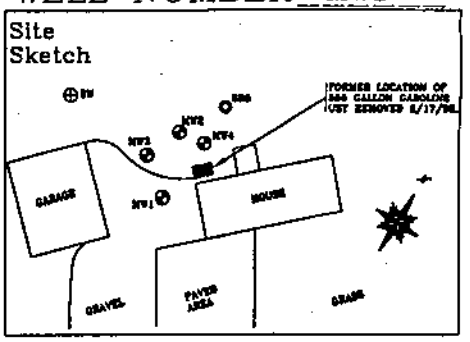
SCREEN DIA. 2" LENGTH 8.25' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 2.5' TYPE sch 40 pvc

DRILLING CO. T&K DRILLING METHOD HSA

DRILLER ALAN & KEVIN LOG BY W. DOE

Site Sketch




*GRIFFIN INTERNATIONAL, INC*

| DEPTH IN FEET | WELL CONSTRUCTION | NOTES | BLOWS PER 6" OF SPOON & PID READINGS | DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES) | DEPTH IN FEET |
|---|---|---|---|---|---|
| 0 | | ROAD BOX<br>LOCKING WELL CAP<br>CONCRETE | | | 0 |
| 1 | | NATIVE BACKFILL | | | 1 |
| 2 | | BENTONITE | | | 2 |
| 3 | | | | Moist, brown, fine to coarse SAND, trace coarse gravel, cobbles, no odor. | 3 |
| 4 | | WELL RISER | 4'–5.5' 13/61/100–5"<br>0 ppm | 4.3' WATER TABLE ▼ | 4 |
| 5 | | | | | 5 |
| 6 | | SAND PACK | | | 6 |
| 7 | | | | | 7 |
| 8 | | WELL SCREEN | | | 8 |
| 9 | | | | | 9 |
| 10 | | BOTTOM CAP | 10'–11.5' 4/21/75–6"<br>0 ppm | Wet, dark brown, fine to coarse SAND, trace coarse gravel, cobbles, no odor. | 10 |
| 11 | | | | | 11 |
| 12 | | UNDISTURBED NATIVE SOIL | | BASE OF WELL AT 11.25'<br>END OF EXPLORATION AT 11.5' | 12 |
| 13 | | | | | 13 |
| 14 | | | | | 14 |
| 15 | | | | | 15 |
| 16 | | | | | 16 |
| 17 | | | | | 17 |
| 18 | | | | | 18 |
| 19 | | | | | 19 |
| 20 | | | | | 20 |
| 21 | | | | | 21 |
| 22 | | | | | 22 |
| 23 | | | | | 23 |
| 24 | | | | | 24 |
| 25 | | | | | 25 |

WELL NUMBER MW4

PROJECT KANGAS PROPERTY

LOCATION SPRINGFIELD, VERMONT

DATE DRILLED 10/13/98 TOTAL DEPTH OF HOLE 15.0'

DIAMETER 4.25"

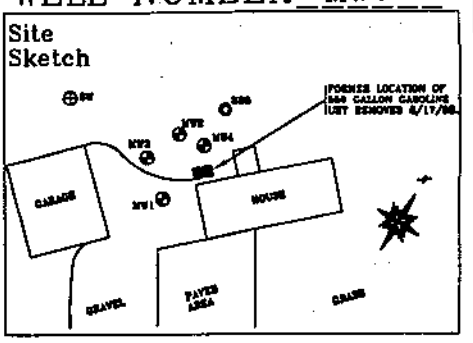
SCREEN DIA. 2" LENGTH 10.0' SLOT SIZE 0.010"

CASING DIA. 2" LENGTH 2.5' TYPE sch 40 pvc

DRILLING CO. T&K DRILLING METHOD HSA

DRILLER ALAN & KEVIN LOG BY W. DOE

Site Sketch




*GRIFFIN INTERNATIONAL, INC*

| DEPTH IN FEET | WELL CONSTRUCTION | NOTES | BLOWS PER 6" OF SPOON & PID READINGS | DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES) | DEPTH IN FEET |
|---|---|---|---|---|---|
| 0 | | ROAD BOX<br>LOCKING WELL CAP<br>CONCRETE | | | 0 |
| 1 | | NATIVE BACKFILL | | | 1 |
| 2 | | BENTONITE | | | 2 |
| 3 | | WELL RISER | 3'-5' 11/29/22/22<br>60 ppm | Moist, brown, fine to coarse SAND, some coarse gravel, slight gas odor at bottom of spoon. | 3 |
| 4 | | | | | 4 |
| 5 | | | | 5.1' WATER TABLE | 5 |
| 6 | | SAND PACK | 5'-6' 111/47-12"<br>250 ppm | Moist, brown, fine to coarse SAND, some coarse gravel, strong gas odor. | 6 |
| 7 | | | | | 7 |
| 8 | | | | | 8 |
| 9 | | WELL SCREEN | | | 9 |
| 10 | | | | | 10 |
| 11 | | | 10'-12' 15/33/38/44<br>0.5 ppm | Wet, brown, fine to coarse SAND, trace coarse gravel, slight gas odor. Sand grades from coarse at top of sample to fine at bottom. | 11 |
| 12 | | BOTTOM CAP | | | 12 |
| 13 | | | | | 13 |
| 14 | | | | | 14 |
| 15 | | | | BASE OF WELL AT 13'<br>END OF EXPLORATION AT 15' | 15 |
| 16 | | UNDISTURBED NATIVE SOIL | | | 16 |
| 17 | | | | | 17 |
| 18 | | | | | 18 |
| 19 | | | | | 19 |
| 20 | | | | | 20 |
| 21 | | | | | 21 |
| 22 | | | | | 22 |
| 23 | | | | | 23 |
| 24 | | | | | 24 |
| 25 | | | | | 25 |

PROJECT KANGAS PROPERTY

LOCATION SPRINGFIELD, VERMONT

DATE DRILLED 10/13/98 TOTAL DEPTH OF HOLE 7.0'

DIAMETER 4.25"

SCREEN DIA. NA LENGTH NA SLOT SIZE NA

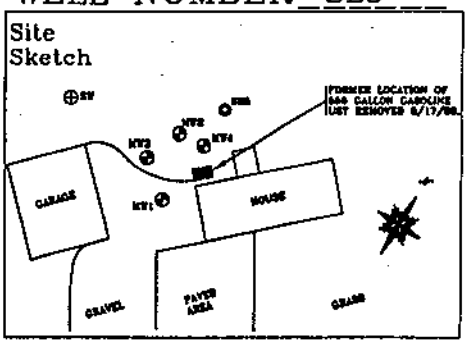
CASING DIA. NA LENGTH NA TYPE NA

DRILLING CO. T&K DRILLING METHOD HSA

DRILLER ALAN & KEVIN LOG BY W. DOE

WELL NUMBER SB5

Site Sketch




*GRIFFIN INTERNATIONAL, INC*

| DEPTH IN FEET | WELL CONSTRUCTION | NOTES | BLOWS PER 6" OF SPOON & PID READINGS | DESCRIPTION/SOIL CLASSIFICATION (COLOR, TEXTURE, STRUCTURES) | DEPTH IN FEET |
|---|---|---|---|---|---|
| 0 | | | | | 0 |
| 1 | | | | | 1 |
| 2 | | | | | 2 |
| 3 | | NATIVE BACKFILL | 3'–5' 38/41/39/48 0 ppm | Moist, brown, fine to coarse SAND, some coarse gravel, some cobbles, no odor. | 3 |
| 4 | | | | | 4 |
| 5 | | | | | 5 |
| 6 | | | 5'–7' 24/44/35/28 0 ppm | Wet, brown, fine to coarse SAND, some coarse gravel, no odor. | 6 |
| 7 | | | | | 7 |
| 8 | | UNDISTURBED NATIVE SOIL | | END OF EXPLORATION AT 7.0' | 8 |
| 9 | | | | | 9 |
| 10 | | | | | 10 |
| 11 | | | | | 11 |
| 12 | | | | | 12 |
| 13 | | | | | 13 |
| 14 | | | | | 14 |
| 15 | | | | | 15 |
| 16 | | | | | 16 |
| 17 | | | | | 17 |
| 18 | | | | | 18 |
| 19 | | | | | 19 |
| 20 | | | | | 20 |
| 21 | | | | | 21 |
| 22 | | | | | 22 |
| 23 | | | | | 23 |
| 24 | | | | | 24 |
| 25 | | | | | 25 |

# APPENDIX C

# Liquid Level Monitoring Data

**Liquid Level Monitoring Data**
**Wally Kangas Rental Property, Springfield, Vermont**

**10/29/98**

| Well I.D. | Top of Casing Elevation | Depth To Product | Depth To Water | Product Thickness | Specific Gravity Of Product | Water Equivalent | Corrected Depth To Water | Corrected Water Table Elevation |
|---|---|---|---|---|---|---|---|---|
| MW-1 | 100.00 | | 4.72 | | | | | 95.28 |
| MW-2 | 99.00 | | 4.19 | | | | | 94.81 |
| MW-3 | 99.70 | | 4.64 | | | | | 95.06 |
| MW-4 | 99.54 | | 4.75 | | | | | 94.79 |

All Values Reported in Feet

Top-of-Casing Elevations Measured in Feet Relative to MW-1 set at 100.00'

# APPENDIX D

## Groundwater Quality Summary

## Groundwater Quality Summary
## Wally Kangas Rental Property
## Springfield, Vermont

**29-Oct-98**

| PARAMETER | Sample Point | | | | | | VGES |
|---|---|---|---|---|---|---|---|
| | MW-1 | MW-2 | MW-3 | MW-4 | Duplicate of MW-4 | Trip Blank | |
| MTBE | <10 | <100 | TBQ <10 | TBQ <50 | TBQ <50 | <10 | 40. |
| Benzene | <1 | 43.4 | <1 | 86.1 | 85. | <1 | 5. |
| Toluene | <1 | 30.7 | <1 | 80.2 | 82. | <1 | 1,000. |
| Ethylbenzene | <1 | 189. | <1 | 84.2 | 82. | <1 | 700. |
| Xylenes | <1 | 1,330. | <1 | 657. | 655. | <1 | 10,000. |
| 1,3,5 Trimethyl benzene | <1 | 244. | <1 | 175. | 176. | <1 | 4. |
| 1,2,4 Trimethyl benzene | <1 | 810. | <1 | 472. | 474. | <1 | 5. |
| Naphthalene | <1 | 103. | <1 | 59.8 | 60.3 | <1 | 20. |
| Total BTEX | **0.** | **1,593.** | **0.** | **908.** | **903.** | **0.** | - |
| | | | | | | | |
| BTEX+MTBE | **0.** | **1,593.** | **0.0** | **908.** | **903.** | **0.** | - |

All Values Reported in ug/L (ppb)
VGES - Vermont Groundwater Enforcement Standard
NA - Not Accessible
ND - None Detected
TBQ - Trace Below Quantitation Limit

Analytical Result Above VGES:

# APPENDIX E

# Laboratory Report

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

# REPORT OF LABORATORY ANALYSIS

CLIENT: Griffin International
PROJECT NAME: Kangas Property
REPORT DATE: November 10, 1998
DATE SAMPLED: October 29, 1998

PROJECT CODE: GIKP1544
REF.#: 130,338 - 130,343

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

# EPA METHOD 8021B--PURGEABLE AROMATICS

CLIENT: Griffin International
PROJECT NAME: Kangas Property
CLIENT PROJ. #: 69841279

DATE RECEIVED: October 30, 1998
REPORT DATE: November 10, 1998
PROJECT CODE: GIKP1544

| Ref. #: | 130,338 | 130,339 | 130,340 | 130,341 | 130,342 |
|---|---|---|---|---|---|
| Site: | MW-1 | MW-2 | MW-3 | MW-4 | MW-4 Duplicate |
| Date Sampled: | 10/29/98 | 10/29/98 | 10/29/98 | 10/29/98 | 10/29/98 |
| Time Sampled: | 14:50 | 15:10 | 14:59 | 15:21 | 15:23 |
| Sampler: | W.J.D. | W.J.D. | W.J.D. | W.J.D. | W.J.D. |
| Date Analyzed: | 11/4/98 | 11/4/98 | 11/4/98 | 11/5/98 | 11/6/98 |
| UIP Count: | 0 | >10 | 0 | >10 | >10 |
| Dil. Factor (%): | 100 | 10 | 100 | 20 | 20 |
| Surr % Rec. (%): | 99 | 88 | 89 | 82 | 85 |
| Parameter | Conc. (ug/L) | Conc. (ug/L) | Conc. (ug/L) | Conc. (ug/L) | Conc. (ug/L) |
| MTBE | <10 | <100 | TBQ <10 | TBQ <50 | TBQ <50 |
| Benzene | <1 | 43.4 | <1 | 86.1 | 85.3 |
| Toluene | <1 | 30.7 | <1 | 82.2 | 81.5 |
| Ethylbenzene | <1 | 189. | <1 | 84.2 | 81.5 |
| Xylenes | <1 | 1,330. | <1 | 657. | 655. |
| 1,3,5 Trimethyl Benzene | <1 | 244. | <1 | 175. | 176. |
| 1,2,4 Trimethyl Benzene | <1 | 810. | <1 | 472. | 474. |
| Naphthalene | <1 | 103. | <1 | 59.8 | 60.3 |

| Ref. #: | 130,343 |
|---|---|
| Site: | Trip Blank |
| Date Sampled: | 10/29/98 |
| Time Sampled: | 6:20 |
| Sampler: | W.J.D. |
| Date Analyzed: | 11/9/98 |
| UIP Count: | 0 |
| Dil. Factor (%): | 100 |
| Surr % Rec. (%): | 0 |
| Parameter | Conc. (ug/L) |
| MTBE | <10 |
| Benzene | <1 |
| Toluene | <1 |
| Ethylbenzene | <1 |
| Xylenes | <1 |
| 1,3,5 Trimethyl Benzene | <1 |
| 1,2,4 Trimethyl Benzene | <1 |
| Naphthalene | <1 |

Note: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

L9841279

31009

# CHAIN-OF-CUSTODY RECORD

| | | |
|---|---|---|
| Project Name: KANGAS PROPERTY<br>Site Location: SPRINGFIELD VT | Reporting Address: | Billing Address: GRIFFIN |
| Endyne Project Number: GIKP154 | Company: GRIFFIN<br>Contact Name/Phone #: WILLIS DOE 8654285 | Sampler Name: WJD<br>Phone #: 865 428[illegible] |

| Lab # | Sample Location | Matrix | GRAB | COMP | Date/Time 10.29.98 | Sample Containers No. | Sample Containers Type/Size | Field Results/Remarks | Analysis Required | Sample Preservation | Rush |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 130,338 | MW-1 | GW | ✓ | | 1450 | 2 | 4oml VOA | | EPA 8021B | HCl/ICE | |
| 130,339 | MW-2 | GW | ✓ | | 1510 | | | | | | |
| 130,340 | MW-3 | GW | ✓ | | 1459 | | | | | | |
| 130,341 | MW-4 | GW | ✓ | | 1521 | | | | | | |
| 130,342 | MW-4 DUPLICATE | GW | ✓ | | 1523 | | | | | | |
| 130,343 | TRIP BLANK | DIST | ✓ | | 0820 | | ↓ | | ↓ | ↓ | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |

| | | |
|---|---|---|
| Relinquished by: Signature Willis Doe | Received by: Signature [illegible] | Date/Time 10·27·98 1600 |
| Relinquished by: Signature [illegible] | Received by: Signature [illegible] | Date/Time 10/30/98 9:50 |

New York State Project: Yes ____ No ✓

Requested Analyses

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | pH | 6 | TKN | 11 | Total Solids | 16 | Metals (Specify) | 21 | EPA 624 | 26 | EPA 8270 B/N or Acid |
| 2 | Chloride | 7 | Total P | 12 | TSS | 17 | Coliform (Specify) | 22 | EPA 625 B/N or A | 27 | EPA 8010/8020 |
| 3 | Ammonia N | 8 | Total Diss. P | 13 | TDS | 18 | COD | 23 | EPA 418.1 | 28 | EPA 8080 Pest/PCB |
| 4 | Nitrite N | 9 | $BOD_5$ | 14 | Turbidity | 19 | BTEX | 24 | EPA 608 Pest/PCB | | |
| 5 | Nitrate N | 10 | Alkalinity | 15 | Conductivity | 20 | EPA 601/602 | 25 | EPA 8240 | | |
| 29 | TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides) | | | | | | | | | | |
| 30 | Other (Specify): | | | | | | | | | | |